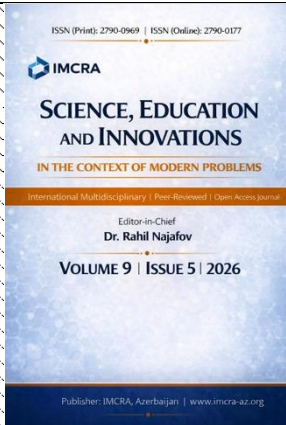



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|   | <h1 style="text-align: center;">Curricular Reform for Primary Teacher Education in the AI Era in Albania: Challenges and Perspectives from the Estonian Model</h1> |

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**Abstract**  
 The rapid advancement of Artificial Intelligence (AI) and Information Technology (IT) has necessitated a radical transformation in initial teacher education. This paper examines the necessity of doctoral-level curricular reform in Bachelor programs for primary education in Albania, aiming to prepare pre-service teachers for effective teaching in the digital era. Utilizing a hybrid methodology that combines documentary analysis of current syllabi with a comparative benchmarking against the Estonian "ProgeTiiger" model, the study identifies significant gaps in existing Albanian curricula. Results indicate that technology in our universities remains isolated as a technical subject, bypassing transversal integration and AI competencies. In contrast, the Estonian model demonstrates that success lies in the application of the Technological Pedagogical Content Knowledge (TPACK) framework and the development of Computational Thinking from the earliest stages of study. The paper proposes a new curricular structure based on four pillars: integrating AI for personalized learning, coding and robotics as cognitive tools, data ethics, and digital safety. We conclude that the reform must shift the focus from the teacher as a tool user to the teacher as an architect of interactive learning environments. This transformation is a sine qua non to ensure that future teachers are capable of leading "digital natives" toward sustainable academic success.

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**1. Introduction**  
 In recent decades, the rapid advancement of technology has fundamentally transformed the paradigms of learning and teaching processes. Students in the lower elementary cycle, who are at a critical stage of cognitive and social development, require teachers capable not only of transmitting foundational knowledge but also of employing innovative methods and technologies that enhance engagement and conceptual understanding. Information Technology (IT) and Artificial Intelligence (AI) hold significant potential to personalize learning, monitor individual progress, and provide interactive tools that render the educational process more efficient and appealing to children.

However, to leverage these opportunities, it is essential that the Bachelor of Education curricula for primary school teachers be adapted and reformed. Currently, while many university programs offer a robust pedagogical and methodical foundation, they

often lack in-depth and structured training regarding the application of IT and AI in teaching. Consequently, graduates complete their studies without the practical digital skills necessary to effectively integrate technology into lower elementary classrooms.

Curricular changes must aim to develop students' digital competencies, including the utilization of educational platforms, the creation of interactive learning environments, and the exploitation of AI for analyzing student progress. Beyond technical proficiency, it is imperative that students acquire the pedagogical skills to adapt instruction based on children's individual needs and to utilize technology in an ethical and secure manner.

This focus is particularly vital for the lower elementary cycle, where the foundations of learning are established and where the use of digital tools can profoundly influence students' motivation, engagement, and academic success. Therefore, curricular reform is a necessity to empower future teachers, ensuring they are prepared to construct a modern, effective learning environment tailored to the needs of lower elementary students.

## 2. Literature Review

Scientific literature emphasizes the TPACK (Technological Pedagogical Content Knowledge) model, developed by Mishra and Koehler (2006), as the primary framework for reforming Bachelor curricula. According to recent studies, simply adding computer science courses to the curriculum is insufficient; reform must target the intersection of pedagogical and technological knowledge. Schmidt et al. (2009) argue that Bachelor programs for primary school teachers should model the use of technology within methodological courses (such as language or mathematics methods) rather than as isolated technical modules.

Research by Wing (2006), followed by the studies of Barr and Stephenson (2011), underscores that elementary school teachers must be prepared to integrate "Computational Thinking" from the earliest stages of schooling. Recent publications suggest that university curricula should train future teachers on how to decompose complex problems into simple algorithms—a skill that precedes programming and advanced AI utilization. Yadav et al. (2017) observe that successful integration depends directly on the exposure of Bachelor students to these concepts during their initial training.

With the emergence of generative AI, scientific literature (Luckin, 2023; Holmes et al., 2022) has begun to examine the need for "AI Literacy" for teachers. Research suggests that the Bachelor curriculum should include modules addressing:

-*Personalization of Learning*: How AI can assist primary school teachers in creating differentiated materials for students with diverse cognitive levels.

-*AI Ethics*: Studies by Zhai et al. (2021) emphasize that future teachers must understand algorithmic biases and children's data privacy, making ethics an integral part of curricular reform.

Comparative studies, such as Tondeur et al. (2012), indicate the existence of a "digital gap" between what students learn at the university level and the reality of primary classrooms. Many authors propose that curricular reform should shift from a "computer use" model toward the SAMR model (Puentedura, 2010), where technology and AI are utilized to completely redefine learning tasks, enabling activities that were previously inconceivable in the elementary cycle.

## 3. Methodology

This study adopts a Mixed Methods Research approach, integrating qualitative documentary analysis with comparative benchmarking to provide a comprehensive framework for the proposed curricular reform. The methodology is designed to transition from identifying existing systemic gaps at the national level toward modeling a contemporary curricular structure that aligns with the dynamic advancements in Artificial Intelligence (AI) and Information Technology (IT).

### 3.1. Documentary Analysis and Benchmarking

The initial phase of the research focuses on Content Analysis of current syllabi and academic curricula across major universities in Albania. This technique examines the degree of digital competency integration by using key indicators such as "algorithmic thinking," "generative AI," and "data ethics." To ensure objectivity and rigor, this analysis is enriched by horizontal and vertical benchmarking. The horizontal analysis compares programs within the country to identify internal consistency, while the vertical analysis contrasts the Albanian national curriculum with the Estonian "ProgeTüiger" model. Estonia was selected as a primary case study due to its global leadership in digital education, serving as a gold standard for integrating high-level technology into initial teacher training.

### 3.2. Analytical Framework: TPACK and DigCompEdu

To evaluate the quality of teacher preparation, the study utilizes the TPACK (Technological Pedagogical Content Knowledge) theoretical framework. This model allows for the identification of the intersection between pedagogical and technological knowledge, verifying whether technology is treated as an isolated tool or as an organic component of subject-specific

methodologies. Concurrently, the competency assessment is guided by the European DigCompEdu framework, which serves as a standardized instrument to define the six essential areas of digital competence required for an educator in the AI era.

### 3.3. Curricular Design Instruments and Procedures

The design of the new course structure follows the principles of Competency-Based Curriculum Design. This methodology emphasizes a shift from static descriptions of course content toward the formulation of learning outcomes that demonstrate practical proficiency in AI utilization. To validate the proposed reform, the Delphi Method is employed, involving a panel of experts in education, IT, and developmental psychology who review the structure for feasibility and academic rigor.

Furthermore, the study incorporates a Needs Assessment through focus groups with pre-service teachers and school mentors. This ensures that the reform is grounded in empirical data regarding the actual challenges faced in primary school classrooms when implementing technology. Finally, the methodology proposes the application of a Spiral Curriculum Model, where AI concepts and Computational Thinking are introduced progressively throughout the three years of Bachelor studies. This methodological approach ensures that the reform transcends simple nomenclature changes, establishing a science-based process that guarantees the sustainability and efficacy of future teacher preparation.

## 4. Results

### 4.1. Results from the Analysis of Current Curricula in Albania

The analysis of syllabi and curricular structures reveals that the preparation of future primary school teachers is conducted in accordance with a traditional approach to Information and Communication Technology (ICT), which is characterized by and results in the following:

#### *Superficial and Non-Integrated Treatment of Technological Knowledge*

Current curricula treat IT as an independent discipline, usually in the first year of study, through courses such as "Applied Informatics" or "Basics of ICT." These modules focus primarily on automating office tasks, such as word processing, spreadsheet design, and basic internet usage. The results indicate a problematic lack of interdisciplinary integration. Digital tools are perceived as administrative instruments for the teacher rather than pedagogical levers to stimulate student learning.

#### *The Artificial Intelligence "Vacuum"*

Although AI has transformed the global educational landscape, analyses show that this term does not appear in any of the Bachelor programs in Albania. There are no modules addressing generative AI or adaptive learning systems. This absence leaves pre-service teachers unprepared to manage the use of these tools by students or to utilize them for personalizing instruction, creating a significant gap between academic competence and the technological reality of the classroom.

#### *Absence of Computational Thinking*

Bachelor degree curricula do not provide for the development of algorithmic skills in future teachers. Unlike international practices—where primary school teachers are trained to decompose problems, identify patterns, and understand coding logic (including unplugged coding)—the focus in Albania remains on consumption and the utilization of digital product features rather than their creation. This hinders the preparation of teachers to develop the analytical skills in children necessary for the 21st century.

#### *Neglect of Ethics and Digital Safety*

Although internet safety is frequently mentioned as a necessary condition, it is not treated as a pedagogical competency. Observation results show that future teachers do not acquire structured knowledge regarding data ethics, the privacy of minors in AI environments, or how to address algorithmic biases.

The analysis of current curricula implemented in first-cycle Bachelor teaching programs in Albanian higher education highlights the existence of a "competency fragmentation" phenomenon. There is a misalignment between training objectives and the requirements for a teacher who must operate in a technology-enriched environment. This "curricular sclerosis" demands an urgent intervention, where technology and AI cease to be "supplementary" subjects and instead become the backbone of teaching methodologies, ensuring that the new teacher is not merely a user, but an architect of modern learning environments.

### 4.2 Comparative Analysis: Albania vs. Estonia (The "ProgeTiiger" Model)

The comparative analysis between the educational preparation systems in Albania and Estonia provides a clear insight into the existing asymmetry regarding the integration of technology and Artificial Intelligence (AI) in Bachelor of Education programs. Estonia, considered a global pioneer in the digital transformation of education, utilizes the "ProgeTiiger" model as a referential

framework that begins as early as preschool and extends to the academic preparation of teachers. This comparison highlights the need for a radical reconceptualization of the Albanian paradigm, moving from technical literacy toward a sophisticated digital culture.

Firstly, the fundamental difference lies in the philosophy of curricular integration. In Albanian universities, as evidenced in the previous analysis, technology is treated as an external and isolated entity. In contrast, the Estonian model is based on the principle of "transversality." Bachelor programs in Estonia do not view technology as a standalone subject, but as a tool present in every subject-specific methodology. Estonian students preparing for primary education are trained from the beginning on how to integrate robotics, coding, and AI tools within subjects such as native language, mathematics, and natural sciences. While in Albania the focus remains on theoretical knowledge of hardware and basic software packages, in Estonia, the priority is the use of these tools to solve complex pedagogical problems.

Secondly, the success of the "ProgeTiiger" model is based on the early development of Computational Thinking (CT). Comparison results show that future teachers in Estonia are equipped with the skills to design simple algorithms and understand programming logic starting from the first year of their Bachelor studies. This allows them to teach children aged 6–11 not only how to use a tablet, but how to understand the logic behind an application or an AI tool. In Albania, this dimension is almost entirely absent from primary education Bachelor curricula, creating a teacher who is primarily a passive consumer of technology, incapable of leading students toward digital creativity.

Thirdly, regarding Artificial Intelligence and Robotics, Estonia has implemented dedicated modules for pedagogical AI. Bachelor students are trained to evaluate the ethics of algorithms and to use adaptive tools that adjust task difficulty based on the individual progress of the student. The comparison results reveal that while Estonian teachers are prepared to be "orchestrators" of an AI-enriched environment, teachers in Albania often view technology with skepticism or as a tool that might replace their authority due to a lack of knowledge regarding the functioning of these systems.

Another critical point of comparison is the supporting infrastructure and industry partnerships. The "ProgeTiiger" model is funded and supported by a wide network of public and private institutions, ensuring that universities have access to the latest technologies. In Albania, curricular reform is often hindered by the lack of functional laboratories and delays in updating syllabi, which fail to reflect the pace of development in the technology industry.

Finally, the assessment of digital competence in Estonia is carried out through clear and measurable standards (such as the DigCompEdu framework), where teacher graduation is contingent upon demonstrating practical skills in technology integration. In Albania, assessment remains primarily theoretical and based on classical examinations, without a strong component for evaluating digital performance during pedagogical practice.

In conclusion, the comparative analysis confirms that Estonia has succeeded in building an ecosystem where technology and AI are organic parts of the teacher's professional identity. For Albania, following the Estonian model does not mean a mechanical copying of curricula, but the adoption of the principle that technology is not a subject to be learned, but a new language through which the entire educational process occurs. The reform in the Bachelor cycle should aim for precisely this transformation: from a teacher who explains technology to a teacher who transforms learning through it.

## 5. Discussion: Toward an Integrative Curricular Reform

The results of the study prove that curricular reform cannot remain a superficial process of updating syllabi but must aim for an ontological transformation of professional teacher training. One of the primary pathways identified is the definitive shift from technology as a "peripheral subject" toward technology as a "pedagogical lever." According to Chai et al. (2013), the preparation of primary cycle teachers in the last decade has demonstrated that teaching effectiveness depends on mastering the TPACK (Technological Pedagogical Content Knowledge) framework. In the Albanian context, this implies that methodological subjects (Language Methodology, Mathematics, etc.) must include modules where technology and AI are used to explain specific subject concepts. This argument is supported by Tondeur et al. (2012), who emphasize that student-teachers gain digital competence only when they see their instructors modeling the use of technology within academic disciplines, rather than as isolated technical training.

A critical instrument that must be included in the Bachelor reform is the development of Computational Thinking (CT). As evidenced by the success of the "ProgeTiiger" model in Estonia, CT should not be confused with pure programming. Yadav et al. (2017) argue that CT is a cognitive process involving problem decomposition and algorithm design—skills that are essential for elementary cycle teachers. The reform should integrate CT as a "second language" in the curriculum, preparing teachers to use educational robotics and logic games as tools for students' cognitive development. This instrument would serve as a bridge between technological abstraction and concrete classroom practice.

Furthermore, the integration of Artificial Intelligence presents a new challenge requiring specific instruments for AI Literacy. Recent publications by Luckin (2023) and Holmes et al. (2022) point out that future teachers must be capable of acting as "data interpreters." In our discussion, this translates to the need for the Bachelor curriculum to contain modules on AI ethics, the data security of minor students, and the management of adaptive learning systems. The instrument of digital ethics should no longer be an optional addition but a pillar of professional integrity. The new teacher must have the critical ability to identify algorithmic biases before introducing AI tools in a school environment.

Another important dimension of the discussion relates to the instrument of "in-situ" pedagogical practice. The identified gap between university theory and the reality of primary schools suggests that the reform must reconceptualize student mentoring. According to Koehler et al. (2014), practical experience is decisive in shaping a teacher's pedagogical beliefs. Therefore, the reform should make graduation conditional upon demonstrating digital competence during practicum hours, where the student is evaluated not only on traditional methods but also on the ability to orchestrate a technology-enriched learning environment.

It is important to emphasize that the standardization of competencies is an indispensable instrument for measuring the success of the reform. The adoption of the European DigCompEdu framework would serve as a compass for Albanian universities, ensuring that future teachers master all six areas of digital competence: from professional engagement to learner empowerment. This standardization would also facilitate international cooperation and academic mobility, aligning Albania with successful models like that of Estonia.

The above analysis shows that the success of curricular reform in Bachelor programs depends on the synchronization of three factors: (i) the political vision for digital transformation, (ii) the updating of university laboratories and infrastructure, and (iii) the retraining of academic staff to model new methods. Without such a multidimensional intervention, there is a risk that future teachers will remain "visitors" in a modern classroom where their students are already "digital natives." The reform should aim to produce a teacher who is not merely a transmitter of technical knowledge, but an architect of learning experiences guided by pedagogy and empowered by Artificial Intelligence.

## 6. Curricular Reform Expectations

The expected outcomes from the implementation of curricular reform in Bachelor programs for primary education are anticipated to be transformative. Its impact should be evident in professional preparation, pedagogical efficiency, and an ethical approach to technology. This process aims to produce a new generation of teachers who are not merely users of Information Technology, but architects of learning environments empowered by Artificial Intelligence (AI).

**Table 1.** A Comprehensive Comparative Analysis of Curricular Structures, Pedagogical Approaches, and AI Integration in Primary Teacher Education

| Dimension                                | Albania (Current Model)   | Estonia (ProgeTiiger Model)  | Identified Gap                                  | Strategic Reform Direction   |
|--|---|--|---|--|
| Curricular Philosophy                    | Technology treated as a standalone subject, primarily focused on basic ICT literacy | Technology embedded transversally across all disciplines as a pedagogical tool | Fragmented and non-integrated curriculum        | Transition toward a transversal and integrated digital curriculum  |
| Role of Technology in Teaching           | Administrative and supportive (e.g., Word, Excel, presentations)                    | Transformative and cognitive (problem-solving, modeling, simulation)           | Limited pedagogical use of technology           | Redefine technology as a pedagogical driver of learning innovation |
| Artificial Intelligence (AI) Integration | Completely absent from curricula  | Integrated into pedagogical training, including adaptive learning systems      | AI competency gap                               | Introduce AI literacy modules and practical applications           |
| Computational Thinking (CT)              | Not included in teacher training programs   | Introduced from early stages; includes algorithmic thinking and basic coding   | Lack of analytical and problem-solving training | Embed CT as a core competency across curriculum                    |

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| Pedagogical Framework                    | Predominantly traditional teaching models                         | TPACK and SAMR frameworks actively applied                              | Weak connection between pedagogy and technology | Adopt TPACK-based instructional design models                                 |
| Teacher Role Conceptualization           | Teacher as knowledge transmitter and tool user                    | Teacher as learning architect and digital facilitator                   | Outdated professional identity                  | Reconstruct teacher identity as designer of AI-enhanced learning environments |
| Assessment Methods                       | Theoretical exams with minimal digital evaluation                 | Performance-based assessment using digital portfolios and real tasks    | Lack of practical competence evaluation         | Implement digital performance-based assessment systems                        |
| Ethics and Digital Safety                | Mentioned superficially, not structured                           | Core component (data privacy, algorithmic bias, digital responsibility) | Ethical awareness gap                           | Integrate AI ethics and digital safety as mandatory modules                   |
| Infrastructure and Resources             | Limited access to modern labs and digital tools                   | Strong institutional and governmental support with advanced labs        | Technological infrastructure deficit            | Invest in pedagogical innovation labs and digital ecosystems                  |
| Industry and Institutional Collaboration | Weak collaboration between universities and external stakeholders | Strong partnerships with tech industry and government programs          | Lack of ecosystem integration                   | Develop multi-stakeholder partnerships (universities-schools-industry)        |
| Teacher Training Approach                | Static curriculum, infrequent updates                             | Dynamic, continuously evolving curriculum aligned with tech trends      | Lack of adaptability                            | Establish continuous curriculum innovation cycles                             |
| Student Preparedness                     | Graduates lack practical digital and AI competencies              | Graduates demonstrate applied digital and AI teaching skills            | Skills mismatch with classroom reality          | Align training with 21st-century classroom requirements                       |
| International Alignment                  | Limited alignment with European standards                         | Fully aligned with DigCompEdu and EU digital education policies         | Weak international compatibility                | Adopt European frameworks (DigCompEdu)  |
| Pedagogical Practice (Practicum)         | Traditional classroom observation and teaching                    | Technology-integrated practicum with real digital tools                 | Theory-practice gap                             | Introduce technology-rich practicum environments                              |
| Innovation Capacity                      | Low level of pedagogical innovation                               | High level of innovation through experimentation and digital tools      | Innovation deficit                              | Foster innovation-oriented teaching culture                                   |

**Source:** Developed by the author based on comparative analysis of Albanian curricula and the Estonian ProgeTiiger model (2026).

The primary expected result involves the enhancement of Technological Pedagogical Content Knowledge (TPACK). Graduates will demonstrate the ability to organically integrate AI and IT tools within subject methodologies. It is expected that future teachers will shift from the simple use of digital tools toward modeling scenarios where AI serves to personalize learning, adapting didactic materials according to the pace and cognitive needs of each student.

The reform must achieve the development of Computational Thinking as a core skill. Teachers will be capable of fostering algorithmic logic and problem-solving abilities in elementary students through educational robotics and basic coding. This

outcome ensures that university training is no longer detached from the requirements of modern schools, thereby reducing the "technological anxiety" that often characterizes the current teaching force.

A critical expected outcome is the formation of ethical awareness and digital safety. The implementation of the reform will equip teachers with the necessary instruments to protect student data privacy and critically evaluate AI-generated information. They will serve as guides for parents and children in navigating digital spaces safely.

Finally, alignment with the European DigCompEdu framework will raise quality standards and the international mobility of Albanian teachers. In the long term, this reform is expected to increase the engagement and academic success of primary school students by creating an interactive, inclusive, and future-oriented learning environment. The success of these outcomes will mark the transition from a traditional educational system toward a digitally competent educational ecosystem.

## 7. Conclusions

This paper analyzes the urgent need for reforming the Bachelor curriculum in primary teacher preparation, focusing on the integration of Information Technology and Artificial Intelligence. The comparative analysis between the current model in Albania and the Estonian model shows that:

The current model of teacher training in Albania is insufficient to meet the challenges of digital education. Treating technology as an isolated and technical subject (often limited to the Office suite) creates a significant gap between teacher competence and the pedagogical needs of the modern classroom. The absence of Artificial Intelligence and Computational Thinking in current syllabi demonstrates a misalignment between the academic offering and 21st-century reality.

The Estonian experience (ProgeTüiger) serves as evidence of the efficiency of transversal integration. This experience shows that technology should not be taught as an end in itself, but as a cognitive tool that empowers the methodologies of language, mathematics, and science. The shift from a "technical" model to a "pedagogical-technological" one (TPACK) is a *sine qua non* for a teacher capable of effectively managing interactive learning environments.

The curricular reform in Albania should be based on four instrumental pillars:

1. Integration of AI as a tool for personalizing instruction;
2. Development of Computational Thinking from the initial stages of the Bachelor degree;
3. Training on data ethics and digital safety;
4. Revision of pedagogical practices to include the assessment of "in-situ" digital competence.

Curricular reform must not be treated merely as an administrative process; it is a fundamental shift in academic culture. Its successful realization requires close cooperation between policymakers, universities, and primary schools. Without a well-prepared teacher at the Bachelor level, investments in the technological infrastructure of schools will remain underutilized. This study highlights the immediate need for Albanian universities to adopt European standards (DigCompEdu) to ensure that future teachers are not just users, but architects of the education of the future.

## 8. Strategic and Practical Recommendations

### 8.1. For Higher Education Institutions (Universities)

*-Hybridization of Methodologies:* An immediate revision of methodological course syllabi (Language, Mathematics, and Science Methods) is recommended to include at least 20–30% of content related to the use of AI and IT tools within that specific discipline.

*-Creation of "Pedagogical Intelligence Laboratories":* Universities should invest in spaces where Bachelor students can experiment with educational robotics (such as Bee-Bot or Lego Education) and adaptive platforms before applying them in practice.

*-Academic Staff Training:* Curricular reform cannot occur without reforming the teaching methods of the faculty themselves. It is recommended to establish internal qualification programs for professors regarding generative technologies and new research tools.

### 8.2. For the Bachelor Program Structure

*-Introduction of a "Computational Thinking and AI" Module:* This module should be mandatory in the second year of study, focusing on algorithmic logic, data ethics, and cybersecurity for children.

*-Digital Performance-Based Assessment:* Student graduation should be conditional upon a digital portfolio demonstrating the ability to create interactive lesson plans and the use of AI for the formative assessment of students.

### 8.3. For Professional Practice and School Linkages

*-Dual Mentorship:* During pedagogical practice, the student should be guided by a mentor (school teacher) who possesses digital competencies, ensuring that technology is actually used in the classroom and not merely discussed theoretically.

*-Partnership with the Estonian Model:* It is suggested to create "Erasmus+" exchange programs or bilateral agreements with Estonian universities to adopt the best practices of the ProgeTüger model.

### 8.4. For Policymakers (Ministry of Education and Sports)

*-Standardization of Competencies:* The official adoption of the DigCompEdu framework as a national guide for the accreditation of teacher education programs is recommended.

*-Incentives for Innovation:* The creation of research grants for Bachelor students who develop innovative projects (such as applications or AI tools) specifically dedicated to the Albanian elementary cycle.

## Ethical Considerations

This study was conducted in accordance with internationally recognized ethical standards for academic research, including the principles outlined by the Committee on Publication Ethics (COPE) and the Declaration of Helsinki (where applicable). The research is based exclusively on secondary data sources and previously published academic literature. Therefore, no human participants were directly involved, and no personal or sensitive data were collected. All sources of information have been properly cited and referenced in accordance with APA 7 guidelines to ensure academic integrity and to avoid plagiarism. The author has made every effort to ensure the accuracy, transparency, and reliability of the data presented. Any potential limitations of the data sources have been critically considered in the analysis.

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## Data Availability Statement

The data supporting the findings of this study are derived from publicly available sources, including official curriculum documents, policy reports, and educational frameworks. These sources are cited within the article.

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## Use of Artificial Intelligence (AI)

No artificial intelligence tools were used in the design, analysis, or writing of this research. All intellectual contributions are solely attributed to the author.

## Conflict of Interest

The author declares that there are no conflicts of interest regarding the publication of this paper. The research was conducted objectively, and no financial or personal relationships have influenced the outcomes or interpretations presented in this study.

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